Space Weather Forecast

Issued on Thursday 26 December 2024 at 12:27 Local

This forecast provides a four-day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales

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Space Weather Forecast Headline: Occasional Minor/Moderate (R1/R2) radio blackouts expected throughout.

Analysis of Space Weather Activity over past 24 hours

Solar Activity: Solar activity has been Moderate, with two Moderate-class flares observed. There are currently twelve sunspot regions on the disc. The largest region on the disc is approaching north centre disc, but this still appears to have a straightforward magnetic structure. Another region in the northeast has been the most active of late, and is showing some minor magnetic complexity. Two regions close together in the southwest both faded a little, with one of them also showing a reduction in magnetic complexity. A further region at south centre disc has seen most of its leading spots fade, with the one remaining spot only just retaining a rudimentary penumbra. Remaining groups appear small and simple at this time.

There have been several large far sided Coronal Mass Ejections (CMEs) in the last 24 hours, making near sided CME analysis more difficult. A CME visible moving northeast in coronagraph imagery from 25/1730UTC onwards is considered likely to miss Earth.

Solar Wind / Geomagnetic Activity: Solar winds showed a return to background conditions after the recent fast wind. The wind speed fell from slightly elevated levels around 480km/s to background levels around 370km/s. The Interplanetary Magnetic Field was weak throughout, with the north-south component varying weakly. Geomagnetic activity was Quiet (Kp 0-1).

Energetic Particles / Solar Radiation: High energy proton flux (greater than 10MeV) showed a continuing gradual decline, well below the S1/Minor Radiation Storm threshold.

Four-Day Space Weather Forecast Summary

Solar Activity: Further Moderate flares are expected, with a slight chance of isolated Strong flares throughout.

Solar Wind / Geomagnetic Activity: The CME from 23 Dec is now considered likely to have missed Earth. Whilst no further CMEs are currently expected, there have been numerous CMEs in recent days and confidence in this aspect of the forecast is lower than usual. Solar winds have now declined to background levels after the recent coronal hole fast wind. A further enhancement is possible, but unlikely on Days 1 and 2 (26 and 27 December). Overall it is considered most likely

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that wind speeds will remain at background or perhaps slightly elevated levels in the absence of CME enhancement.

Geomagnetic activity is expected to be mainly Quiet to Unsettled, but with a very slight risk of Active to G1/Minor Storm intervals should any glancing CME effects occur.

Energetic Particles / Solar Radiation: There is a slight chance of S1/Minor Radiation Storm or greater enhancements during the period. In the absence of any further notable flares, ongoing slightly enhanced energetic particle counts should ease towards background levels in the coming days.

Geomagnetic Storms

Geomagnetic Storm Probability (Exceedance)	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Minor or Moderate	G1 to G2	No	5	5	5	5
Strong	G3	No	1	1	1	1
Severe	G4	No	1	1	1	1
Extreme	G5	No	1	1	1	1

Radio Blackouts - X-Ray Flares

X-Ray Flares Probability	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	R1-R2 (M Class)	Yes	80	80	80	80
Very Active	R3-R5 (X Class)	No	15	15	15	15

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Solar Radiation Storms (High Energy Protons)

Radiation Storms Probability (Exceedance)	Level ($cm^{-2}sr^{-1}s^{-1}$)	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	**≥ S1**	No	10	10	15	15
Very Active	**≥ S3 ***	No	1	1	1	1
* S3 ≥ 10 MeV ≥ 1000 pfu and/or 50 MeV ≥ 10pfu. (pfu = $cm^{-2}sr^{-1}s^{-1}$)						

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